the case, but the eggs remain in the nest in which they were originally placed by the parent Cuckoo, and are duly hatched by the foster-parent. That being so, the necessity for the law of nature which the Doctor wishes to establish falls to the ground. I do not like to put forward my own opinion against such great authorities as Dr. Baldamus and Professor Newton, but I think the inquiry now set on foot in this country by the publication in English of Dr. Baldamus' paper in *Naumannia* will be to show that Cuckoo's eggs do not in fact vary from each other more than those of many others, and that the resemblances to the eggs of many other species are not greater than sometimes arises in many ordinary cases.

CECIL SMITH

The Cloaca Maxima

YOUR correspondent "Ignoramus" will find some account of the drainage of Rome in Pliny ("Hist. Nat." xxxvi. 15, s. 24). He will also find further particulars in Livy (i. 38), and in Ulpian ("Dig." 43, tit. 23, s. 1).

History repeats itself. Just as the London sewers were originally natural brooks or artificial ditches by which the rainfall of the district was carried off, and into which it was penal, down to the year 1815, to turn any "sewage" proper; so the Cloaca Maxima was built originally, in very early times (by Tarquinius Priscus, according to Livy), to carry off the rain-water from the Forum. Afterwards, however, all kinds of liquid refuse were allowed to find their way into it; and this seemed such a convenient way of getting rid of troublesome matter, that the whole city was eventually undermined by a network of sewers, including small pipes of wood and earthenware connecting the houses with the main sewers. Whether "traps" were also used I am unable to say, but I think it very probable that some simple combination of trap and cess-pit, in masonry, was used to prevent an up-blast of foul gas into the *atrium.*

What became of the solid refuse I do not know, but from all that I can gather I imagine it must have been carted away periodically. I trust some of your readers may have compassion for our ignorance, and, by enlightening us on this point, completely restore to "Ignoramus" that peace of mind which he lost in early childhood.

I trust also that the days of river cloacal pollution, in this country at least, are numbered, and that the advances which other sciences have made in the last 2,000 years will at last make our engineers ashamed of their ignorant violation of what I hope I may be allowed to call one of the laws of Nature.

W. HOPE

Hydro-carbon Colours

CAN your readers inform me of any book in which I can get to know all that is known on the "Hydro-carbon colours, and their application to Art industry," or direct me to any sources where the information can be obtained?

Plymouth, December 18 T. W. FRECKELTON

NOTES

THE *Journal of Botany* will pass into new management with the commencement of the year. The leading English botanists have promised their co-operation towards making it a complete record of the progress of botany at home and abroad during the month. It will in future be edited by Mr. W. H. Trimen, M.B., of the British Museum, author of "A Flora of Middlesex."

THE persistent decrease in the yield of our sea-fisheries has assumed a serious aspect, and urgently calls for systematic investigation at the hands of the Government. The usual machinery for such investigations, namely, a Royal Commission, could, however, hardly obtain the exact kind of information necessary for a determination of the probable cause of the mischief. Nothing short of the appointment of Inspectors of Sea Fisheries, with analogous functions to those discharged (with such beneficial results) by the Inspectors of Salmon Fisheries, can afford the opportunity for a thorough examination of the subject, and prepare the way for useful legislation. This course is ably advocated in the last number of *Land and Water*, and we feel it incumbent upon us strongly to second the recommendations of our contemporary on this point.

THE Ethnographical Section of the Geographical Society of Berlin, which has existed in a more or less definite form for about three years, has just separated itself from the parent organism, and entered upon an independent career as the Society for Anthropology and Ethnology. The first ordinary meeting of the new society took place on the 10th instant, when a paper was read by Professor Virchow on the North-German Pile-works. As compared with the great majority of such remains in Switzerland and South Germany, the pile-works of the North are not of very high antiquity. There is only one colony, that of Wismar, which belongs to the Stone period; even the older forms of bronze are rarely met with. The mode of construction of the pile-works likewise indicates an advance on that employed in Switzerland. Professor Virchow is of opinion that some, at least, of the earthworks found in certain districts are contemporary with the lake habitations: evidence on this interesting point is promised at some future time. That the pile-works, although of comparatively recent date, are really pre-historic, is indicated by the discovery of the remains of beaver and elk. The latter animal is not mentioned by the old chroniclers of Brandenburg and Pomerania; neither do we find mention of any lake-dwelling people in the ancient Scandinavian or Polish historians.

WE understand that steps are being taken to found an anthropological society in Hamburg, but no particulars have as yet reached us.

WE extract the following from the last Weekly Bulletin (26th inst.) of the Scientific Association of France:—"The vine occupies in France almost 2,500,000 hectares (6,175,000 acres). This constitutes the one-and-twentieth part of the French territory, and the sixteenth part of its soil capable of cultivation. The gross produce amounts to more than 1,500,000,000 francs. This industry occupies six million men, women, and children, and nearly two million merchants, agents, traders, &c. Sixty-nine departments cultivate the vine, from the Gironde, which reckons more than 150,000 hectares (370,500 acres), to the department of Ille-et-Vilaine, which only possesses 104 hectares (256 acres)."

THE commission appointed by the Imperial Academy of Medicine in Paris to investigate the subject of vaccination has just concluded its labours by the presentation of its Report, which has been adopted.

MR. J. MIERS, so well known for his researches in the Botany of South America, is about to publish the second and third volumes of his "Contributions to Botany," which will include a complete monograph of the *Menispermaceæ*, and of the South American species, of *Ephedra*, showing that this genus does not belong to the Gymnosperms or naked-seeded plants, as generally believed.

IN a letter of the 17th ultimo, addressed to the *Astronomische Nachrichten*, Dr. Oppolzer discusses the observations of a faint comet discovered by Pons in February 1808, and arrives at the conclusion that it is exceedingly probable that the comet referred to is identical with that named after Winnecke. Dr. Oppolzer is at present engaged in working out the observations of the latter comet, more especially in reference to its supposed identity with Comet II. of 1766.

WE regret to learn from the recent report of the Miners' Association for Cornwall and Devonshire, that that useful body is in danger of being dissolved in consequence of the inadequate support it receives from the mining interest. The importance of combining scientific knowledge with practical experience, if we intend to maintain our present position in mining and metallurgy as against the highly-trained miners of other countries, is acknowledged by every competent person. Surely, then, when owners of mines and shareholders in mining companies learn that the Miners' Association not only discusses and publishes important scientific papers of a practical character, but is at the present moment educating in its classes more than a hundred young men in chemistry, mineralogy, geology, and mining, they will not suffer so important an institution to die out or languish for want of funds. Mr. Robert Hunt, F.R.S., keeper of the Mining Records, is the hon. general secretary of the association. The Report for 1869 is published at Truro (Heard and Sons), and is to be had for a shilling.

BENZOL has been applied to a somewhat novel purpose. If poured on a piece of ordinary paper, immediate transparency is produced, to such an extent as to enable one to dispense entirely with tracing-paper. On exposure to air, or, better, a gentle heat, the liquid is entirely dissipated, the paper recovers its opacity, and the original design is found to be quite uninjured.

WE are glad to learn that the acceptance, by Dr. Czermak, of an honorary professorship in the University of Leipzig is likely to lead to a departure from the rule hitherto observed in the German universities, of treating physiology as an integral part of the medical course. No doubt lectures on general physiology, with a more particular view to the special requirements of the medical student, will always be necessary; but the claims of the general student to a sound knowledge of the principles and methods of this science can no longer be ignored. Independently of the fact that physiology deals with subjects of the highest possible general interest, it must not be forgotten that in its present stage of development it can hardly be looked upon otherwise than as an extension of the physical and chemical sciences. The lectures which Prof. Czermak contemplates giving for the general benefit of the University of Leipzig are not intended to be of a so-called popular nature. They will be of the same general character as the ordinary lectures on physics, logic, or general history. The Professor insists very strongly upon the absolute necessity of direct observation for a thorough understanding of the subject; and it is solely the want of a suitable theatre and apparatus for enabling large audiences to view physiological experiments, that prevents his entering upon the promised course of lectures this winter. Dr. Czermak spoke so eloquently and so thoroughly in earnest on this subject on the occasion of his recent installation as Honorary Professor, that we make no doubt he will be able to carry out his plans successfully during the ensuing summer term.

WE have a fresh illustration of the intimate alliance between science and commerce. Mr. Winwoode Reade recently set out from Sierra Leone to explore the interior, the funds of the expedition being defrayed by the munificence of Mr. Andrew Swanzy, a London merchant. Communications have been recently received stating that Mr. Reade, travelling on a line to the south-east of the routes of Park and Caillie, has reached a point farther south than any of his predecessors. The solitary traveller, after surmounting many difficulties, was rewarded by reaching a hitherto unknown town named Farabana, situate about 10° N. lat. and 10° W. long. He had crossed several rivers, flowing we presume from the watershed of Mount Loma, and was among the head-waters of the River Niger. The town, Farabana, contains about 10,000 inhabitants, well-disposed, and eager for trade. Mr. Reade mentions his having experienced protection and help from the Sultan of Bornir; we suppose, by orders issued to his subordinate chiefs and headmen, in this outlying district of his kingdom. We may hope that Mr. Reade's discoveries will enrich our maps with accurate geography of the country to the north of the Cong Mountains, as marked on the maps, and of the Niger from its source to the point where previous travellers have struck its stream.

THE theory of the derivation of the primitive population of Western Europe from an African source is likely to receive some confirmation from recent researches in Algeria. A Mr. Faidherbe, who has examined a necropolis of 3,000 Megalithic graves at Roknia, in the province of Constantine, reports that the skulls obtained have led him to the conclusion that the Berbers were the original people of the Atlas; and that they do not resemble any African or Semitic race, but rather the earliest inhabitants of Western Europe.

THE "Transactions of the Swedish Academy of Sciences for 1868" contain a paper proposing the use of the reindeer moss and various other species of lichen as a material for the manufacture of sugar and alcohol. By means of dilute sulphuric or muriatic acid, the cellulose of the plant is turned first into dextrine, and then into grape-sugar. No experiments on a large scale have as yet been made, but the author of the paper is sanguine as to the economic success of such an undertaking. Of the other papers printed in this volume of "Transactions," we may mention the following:—"On a remarkable species of sponge living in the North Sea," by Professor Sven Lovén, and "Swedish and Norwegian Diatoms," by P. T. Cleve. These communications are illustrated by drawings. The other papers, with the exception of three by Edlund, detailing researches in reference to the electric spark, relate chiefly to the fauna and geology of various parts of the Swedish kingdom. The Memoirs of this Academy for the year 1868, containing the more important papers presented, have not yet reached us.

THE Native Guano Company, now successfully treating the sewage of the town of Leamington by the A.B.C. process, have applied to the Metropolitan Board of Works to enter into a treaty with them for the concession of the sewage on the south side of the Thames. The question has been referred to the Works Committee. Should the concession be granted, the movements of the company will be watched with great interest, as their success or failure will tend greatly to settle the question of the possibility of making the purification of the sewage of *great towns* a commercial success.

HERR KARL BRUHNS, director of the Berlin Observatory, is preparing for publication a scientific life of Humboldt, to which several illustrious German scientific men have promised to contribute. The first portion, from the pen of Dr. Ave Lallemand, will contain the life, properly so called, of Humboldt. The second part will be devoted to an account of his researches and discoveries. This latter part will occupy eight chapters, and will be confided to writers possessing special qualifications for the task. Persons having in their possession unpublished materials relative to the life or labours of Humboldt are requested to transmit them to Herr Bruhns.

OYSTERS are now so dear in London that we may reap some contentment by learning that they are sold wholesale in San Francisco, at the rate of six shillings a dozen. These oysters are said very much to resemble our "natives;" being round, fat, full-flavoured, and very good; but they do not suit the taste of those who have long enjoyed the luxury of the large, delicate molluscs of the Atlantic seaboard. There are fine beds of the long-shelled oyster in the Gulf of California, and as they will not grow in the Pacific, they are transported 1,700 miles by steamer to "Frisco;" about half the cargo dying on the passage. Notwithstanding all the oyster controversy and oyster literature of recent years, it is still very hard to understand why they should be so dear in London. At Van Laar's shop, in the Kalverstraat, at Amsterdam, the very finest oysters, thought by many to be much superior to the "natives," may be eaten at the rate of 50 cents (10*d.*) the dozen.

THE first part of a Hand-List of Genera and Species of Birds, by Mr. G. R. Gray, has just been issued from the British Museum. It includes the *Accipitres*, *Tenuirostres*, and *Dentirostres*, and forms an octavo volume of 400 pages. All the recognised genera, sub-genera, and species are enumerated, and not merely the species represented in the national collection. The latter are, however, specially indicated. Some notion of the marvellous variety of bird-form may be gathered from the fact that this volume gives the name and habitat of no less than 6,057 species. The second and concluding volume is stated to be far advanced towards completion. We have also to chronicle, for the benefit of our entomological readers, the appearance of Part II. of the Catalogue of Specimens of *Dermoptera Saltatoria* in the British Museum, by Mr. Francis Walker.

A LARGE depôt of petroleum has just been discovered in the Caucasus. It is situated on the east of the Caspian, where there are large numbers of these springs, many of them occurring in close proximity. This new spring is said to be capable of producing 40,000 livres daily. The American method has recently been adopted with the greatest success.

DR. ROBINET, formerly president of the Paris Academy of Medicine, member of the Municipal Council, and at one time president of the Hygienic and Sanitary Commission of the City of Paris, has just died. His decease was due to an affection of the chest, contracted whilst on a scientific expedition in Germany. Dr. Robinet had completed his 72nd year.

IT appears that the surface glass which contains soda undergoes considerable change after a lengthy exposure to the air. Bluish glass undergoes no such alteration, but that which has originally a greenish tinge becomes brown after a time, whilst very pure white deteriorates rapidly, showing first a yellow, then a brown, and finally a violet film. At this season of the year we do not require this additional colouring to the appearance of our already discoloured atmosphere. It has been noticed that some modern stained glass on a foggy day has almost the richness of the ancient. We need not go far for a solution of this. The old glass has acquired in the course of ages a film which takes the place of a permanent fog, especially on those colours which, like the ruby, are formed by a thin coating of the coloured glass on a thicker plate of transparent metal.

THE Agricultural Society of France has recently addressed the following questions to each of its members, and to the presidents of all the French Agricultural Associations:—"1. Can the depreciation in the price of wool be remedied; and, if so, by what means? Does the rise in the price of meat afford a sufficient compensation to the producers of wool? 2. Do the production and sale of cereals meet with any obstacle demanding the attention of the legislator? 3. Is there any defect in the facilities for increasing the domestic consumption or the exportation of wine? 4. Have the agricultural industries, especially those which produce alcohol and sugar, any need of modification as regards the economic regulations to which they are subject? 5. Are there in your district any other branches of agricultural produce suffering from a crisis to which it would be necessary to call public and legislative attention?"

WE have been requested to state that the cable laid between Salcombe and Finisterre (Dec. 2nd) was manufactured at W. T. Henley's Telegraph Works, North Woolwich.

SCIENTIFIC SERIALS

IN the *Annales des Sciences Naturelles* (Zoologie, Tome xii. Nos. 3 and 4), M. Marcy continues his elaborate paper on the flight of Insects and Birds. Prof. E. Lartet describes and figures *Trechomys Boudnellii* and two other fossil rodents of the Eocene of Paris. New observations on the Zoological Characters and Natural Affinities of the Æpyornis of Madagascar are given by MM. Alphonse Milne-Edwards and Alf. Grandidier. Their paper is illustrated by a fine series of figures of the bones of these gigantic fossil birds: even the enormous bones of the lower limb are drawn the size of nature. The present double number of the *Annales* is concluded by a communication from M. Edward Perrier, entitled "Researches on the *pedicellaria* and *ambulacra* of star-fishes and sea-urchins."

THE November number of the *Annales de Chimie et de Physique* contains the termination of a long memoir by Lecoq de Boisbaudran, on Supersaturation; a memoir by Des Cloiseaux, on Gadolinite, a mineral whose anomalies are very lucidly connected and explained; a very interesting paper by Boussingault, on the Function of Leaves, in which the influence of light is studied as affecting the decomposition of carbonic acid; Observations on a Note of M. Velter as to the agricultural utility of salt, by Peligot; a Chemical Study of Egyptian wheat, by Aug. Houzeau; the Polarisation of the Blue Light of Water, by J. L. Soret (taken from the Geneva *Archives*); and an account of Roberts's elegant experiment, showing the increase of volume undergone by palladium in combining with hydrogen.

THE November number of Reichert and Du Bois Reymond's *Archiv fur Anatomie* contains the following papers:—"The Influence of Artificial Respiration on Reflex," by Dr. P. Urspensky, of St. Petersburg; "Musculi subcrurales et Subanconaci," by Dr. M. Kulaewsky; "The 'Ramus collateralis ulnaris nervi radialis again," by Professor W. Krause, of Göttingen; "The Inter-arytænoid Cartilage of the Human Vocal Organs," by Professor H. von Luschka, of Tübingen (plate); "On the Influence of the Curara Poison on the Electromotor Power of Muscles and Nerves," by Hermann Rocher; "The Nervi Splanchnici and the Ganglion Cœliacum," by F. Bidder, of Dorpat; "On the Musculus Broncho-œsophagus Dexter," a communication by Dr. Wenzel Gruber, Professor of Anatomy at St. Petersburg.

POGGENDORFF'S *Annalen der Physik und Chemie*, 1869. (No. 11. Vol. cxxxviii. Part 3). The physical papers in this number (the last published) are:—

(1.) "On the applicability of Ohm's Law to Electrolytes, with a numerical determination of the Electrical Resistance of dilute sulphuric acid by means of alternating currents," by F. Kohlrausch and W. A. Nippoldt (pp. 370 to 390). This paper forms the continuation and conclusion of one begun in the previous number of the "Annalen." After discussing the special difficulties that lie in the way of accurate determinations of the galvanometric properties of electrolytes, the authors show how the most important of them, the polarisation of the electrodes, may be overcome by substituting for a continuous current in one direction a rapid succession of currents of short duration in opposite directions. Such currents were obtained by the rotation of a steel magnet inside a coil of wire; and the employment of them necessitated the use of a Weber's bifilar dynamometer, instead of an ordinary galvanometer. There is a full discussion of the action of the rotating magnet, showing the mean electromotive force due to a given velocity of revolution, and the action of the resulting current on the dynamometer. In the part of the paper now published, the strength of the current traversing a column of dilute sulphuric acid is proved to be proportional to the electromotive force even when the latter does not exceed $\frac{1}{74}$ part of that of a Grove's cell. By using thermo-electric currents, the proportionality between electromotive force and strength of current, in the case of solution of sulphate of zinc between amalgamated zinc electrodes, is shown to hold good even when the electromotive force is only $\frac{1}{429000}$ of that of a Grove's cell. The paper concludes with a series of numerical determinations of the specific resistance of dilute sulphuric acid of various degrees of concentration, from which we quote the following:—At 22° C. the maximum conducting power is possessed by sulphuric acid of specific gravity 1·233 (containing 31·5 per cent. hydric sulphate); taking the conducting power of mercury at 0° as unity, the conducting power of such acid is 0·000077274.

(2.) "On a Comparable Scale for Spectroscopic Observations," by A. Weinhold (pp. 417 to 439). In order to compare the indications of various spectroscopes, the author proposes to denote the various parts of the spectrum by reference to the interference-bands seen in the spectrum of light reflected from a thin plate of biaxial mica; and to reduce the results obtained by the use of plates of various degrees of thickness to a common denomination, by taking two definite parts of the spectrum, *e.g.*, Fraunhofer's lines D and F, as fixed points, and dividing the interval between them into 100 parts. The bands of the interference-spectrum then become comparable with the divisions on an arbitrarily graduated thermometer, the value of which is determined by observing two fixed temperatures. The paper contains a full and careful description of the way of carrying out the proposed method in practice.

(3.) "Experiments on Retarded Ebullition" (third part), by